

CLAIMS

1. A process for providing a protective coating on a substrate comprising

(1) applying to the substrate a coating composition comprising an homogeneous mixture comprising an inorganic sol and polymerisable organic species, the inorganic sol being obtainable by hydrolysing hydrolysable inorganic monomer precursors to form inorganic monomers;

(2) polymerising the polymerisable organic species; and

(3) polymerising the inorganic monomers, wherein polymerisation of the organic monomers is initiated prior to completion of polymerisation of the inorganic monomers, to form a solid coating on the substrate.

2. A process according to claim 1, wherein hydrolysis of the hydrolysable monomer precursors takes place in the presence of a mineral acid.

3. A process according to claim 1 or claim 2, wherein the hydrolysable inorganic monomer precursors are alkoxides, preferably alkoxysilanes.

sub A₁ > 4. A process according to any preceding claim, wherein the inorganic sol is obtainable by hydrolysis of first and second hydrolysable inorganic monomer precursors, the first hydrolysable inorganic monomer precursors being different to the second hydrolysable organic monomer precursors and having at least two hydrolysable groups, and the second hydrolysable inorganic monomer precursors having at least one non-hydrolysable group.

5. A process according to claim 4, wherein the ratio of the first hydrolysable monomer precursors: second hydrolysable monomer precursors is in the range 0.75 to 0.9.

6. A process according to claim 5, wherein the ratio of first hydrolysable monomer precursors: second hydrolysable monomer precursors is in the range 0.78 to 0.88.

sub A₂ > 7. A process according to any of claims 4 to 6, wherein the first hydrolysable monomer precursors comprise a

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tetraalkoxysilane and the second hydrolysable monomer precursors comprise an alkoxysilane having at least one ethylenically-unsaturated group and/or an epoxy group.

8. A process according to claim 7, wherein the first hydrolysable inorganic monomer precursors comprise tetraethoxysilane and the second hydrolysable precursors comprise 3-(trimethoxysilyl)propylmethacrylate.

SUB A₃

9. A process according to any of claims 4 to 8, wherein the sol is obtainable by hydrolysing the first and second hydrolysable monomer precursors separately from one another to form a first sol and a second sol, and mixing the first and second sols.

10. A process according to any preceding claim, wherein the sol is aged prior to mixing with the polymerisable organic species.

11. A process according to any preceding claim, wherein the polymerisable organic monomers are added to the sol in liquid or solution form.

12. A process according to any preceding claim, wherein the polymerisable organic species are polymerisable to form a thermosetting material.

13. A process according to claim 12, wherein the polymerisable organic species are selected from carbonates, urethanes, urethane precursors such as isocyanates or diisocyanates and polyols, urethane acrylates and terephthalates.

SUB A₄

14. A process according to any preceding claim, wherein the substrate is selected from thermoplastic materials, thermosetting materials, metals, ceramic materials, natural materials, or any of these materials which are pre-coated e.g. with a decorative finish.

15. A process according to claim 14, wherein the substrate comprises a polycarbonate or a polyacrylic material.

SUB A₅

16. A coated substrate obtainable by a process according to any preceding claim.

17. A coated substrate according to claim 16, wherein the coating is transparent.

18. A coating composition comprising an homogenous mixture comprising an inorganic sol and polymerisable organic species, the inorganic sol being obtainable by hydrolysing hydrolysable inorganic monomer precursors to form inorganic monomers.

19. A coating composition according to claim 18, having the features as defined in any of claims 1 to 18.

20. A process for bonding together at least two articles comprising applying to the surface of one or each article a composition as defined in claim 18 or claim 19, bringing the surfaces to be bonded into contact with one another, and then curing the composition, to form a secure bond.